REMARKS

Claims 27-52 are pending in the application. These claims were rejected as follows:

Claims / Section	35 U.S.C. Sec.	References / Notes
27-29, 35-40, 42-44, 46-50 and 52	§103(a) Obviousness	• Pullen (U.S. Patent No. 5,867,221); and • Wober (U.S. Patent No. 5,748,792).
30-34, 45	§103(a) Obviousness	• Pullen (U.S. Patent No. 5,867,221); • Wober (U.S. Patent No. 5,748,792); and • Girod (U.S. Patent No. 5,854,858).
41, 51	§103(a) Obviousness	• Pullen (U.S. Patent No. 5,867,221); • Wober (U.S. Patent No. 5,748,792); and • Kwan (U.S. Patent No. 5,910,827).

Applicant has provided discussion below for distinguishing the present invention from the art cited against it.

35 U.S.C. §103(a), CLAIMS 27-29, 35-40, 42-44, 46-50 AND 52 OBVIOUSNESS OVER PULLEN IN VIEW OF WOBER

1. The combination of Pullen and Wober fails to teach or suggest a grouping of picture elements into image segments within a digitized image that omits at least one picture element from between the image segments. Wober only teaches overlap, inclusion and redundancy of picture elements for within-image groupings in contrast to the omission/exclusion picture elements for within-image groupings according to the present invention.

In prior Office Actions, the Examiner cited Pullen as providing a grouping picture elements except at least one into a number of image segments where the ungrouped element(s) was from an area of the image located between the image segments, while only encoding picture elements being grouped into an image segment.

Applicants then amended the independent claims to include the further limitation that the grouping, which omitted at least one picture element located between image segments, was based on a mathematically defined region of the digitized image derived solely from the digitized image itself (i.e., an *intra*-image based grouping). Since Pullen addressed grouping based on an *inter*-image (between multiple images) defined region, this limitation served to distinguish the independent claims from the disclosure of Pullen as an anticipating reference.

The Examiner responded to the amendment by submitting the Atkins reference in combination with the Pullen reference as an obviating combination for the newly added limitation that the mathematically defined region is derived solely from the digital image itself. The Applicants traversed the use of Atkins as a 35 U.S.C. §103 reference by providing a 37 C.F.R. §1.131 declaration of the inventor, and the Examiner substituted the newly cited Wober reference in place the Atkins reference as providing an obviating combination.

With regard to the Pullen reference, Pullen implements an *inter*-image data compression by transmitting only unchanged pixilated data between *sequential* (multiple) frames/images. A single transmitted frame according to the Pullen reference would experience no data compression whatsoever.

The present invention addresses the problems of block artifacts at the edge of image blocks in block based encoding or object edge artifacts in object based image encoding. That is, the present invention relates to dealing with the abrupt changes of the values of the encoding information that is allocated to the individual picture elements produced by continuity points at the image block edges or respectively at the image object edges (see the introduction on page 1 of the present application).

Consequently, the object underlying the present invention is to provide a method and an apparatus, respectively, which enables image encoding and transmission where the problem of these image disturbances are remedied or at least less noticeable.

According to the present invention, this object is achieved by grouping all except at least one picture elements of a digitized image into a number of image segments (for example, the image blocks or objects mentioned above), the at least one ungrouped picture element being from at least one area of said image located between image segments, and encoding only said picture elements being grouped into an image segment where the grouping is based on a mathematically defined region of the digitized image derived solely from the digitized image itself (claim 27). This corresponds to the Example given in Figure 1 B and 1 C, where the parts of the picture between the image blocks BB are not encoded, and only the picture blocks themselves are encoded. As stated in claim 28, after transmission, the "missing" parts of the picture are restored by interpolating between the encoded, transmitted and decoded picture blocks BB. The same holds true for the corresponding arrangement claims 43 and 44.

Since at least one picture element between the image segments are not encoded and not transmitted and interpolated after transmission and decoding, edge artifacts, for example, do not appear or are less noticeable as there is an interpolation area between adjacent image segments.

Contrary to the present invention, Pullen et al. relates to a system and method for compressing related data sets of a *sequence* (see first sentence of the abstract). Although there is some data which is not encoded and not sent for conserving bandwidth, this not encoded data corresponds to data which is unchanged from one frame to the next. Thus, Pullen et al. clearly relates to comparing several frames in a sequence and does not utilize a grouping based on a mathematically defined region of the digitized imaged derived solely from the digitized image itself.

The present invention can achieve compression within a single image frame in contrast to Pullen, which requires multiple sequential frames to operate. In the OA on p. 4, the Examiner acknowledged that Pullen does not disclose the limitation based on a mathematically defined region of said digitized image derived solely from said digitized image itself.

However, in adding the Wober reference, the Examiner stated on p. 4 of the OA:

> However, Wober teaches the number of image segments based on a mathematically defined region of the digitized image is derived solely from the digitized image itself [equating of Wober features to claim elements].... Therefore, it would have been obvious to one of ordinary skill in the art to take the teachings of Pullen and Wober, as a whole, for implementing Wober system of improving data image resolution with Pullen's image compression/decompression system so as to overall improve image quality at the receiving end in order to

> display high quality images even if the image data transmitted was originally from low quality image data...

Applicants disagree with the assertion that the addition of Wober serves to fill the deficiency of the Pullen disclosure so as to obviate the present invention.

The Examiner cites Wober as teaching the use of grouping picture elements of a digitized image into a number of image segments based on a mathematically defined region of the digitized image derived solely from the digitized image itself—however, such a disclosure is insufficient to obviate the present invention. The invention requires that the grouping which is based on a mathematically defined region of the digitized image derived solely from the digitized image itself *exclude* at least one picture element—the combination of Pullen and Wober fails to teach this "excluding" aspect with respect to the grouping derived solely from the digitized image itself, and furthermore fails to teach such ungrouped/excluded elements being from at least one area of the image located between the image segments.

Wober teaches to segment an image into data blocks of a predetermined size where adjacent data blocks overlap each other by a predetermined number of pixels. This feature is stressed several times in the Wober reference (see Abstract, Fig. 2, column 2, lines 40-42 or column 4, line 65, column 5, line 3) and is also present in all of the independent claims of Wober. In stark contrast to the present invention which teaches a grouping that *excludes* picture elements, Wober teaches a grouping that *redundantly includes* picture elements from other groups (Fig. 2, showing groups with overlapping elements).

The redundant inclusion of picture elements within a group is not just an obvious variant of the present invention's grouping that excludes picture elements, because there is no motivation to combine Pullen with Wober to arrive at the present invention. The Examiner states the motivation to combine on p. 4 of the OA:

> Therefore, it would have been obvious to one of ordinary skill in the art to take the teachings of Pullen and Wober, as a whole, for implementing [the] Wober system of improving data image resolution with Pullen's image compression/decompression system so as to overall improve image quality at the receiving end in order to display high quality images even if the image data transmitted was originally from low quality image data (col. 2 ln. 33-37).

Both the present invention and Pullen deal with the issue of data compression for transmission—Pullen deals with a compression related to a sequential transmission of multiple images and the present invention deals with a compression related to a transmission of a single image. Wober, however, does not deal with the issue of compression at all, but rather deals with processing a large image by breaking it down into a series of smaller images, processing each of the smaller images independently (because the filter has a processing capability incapable of handling the larger image), then reassembling the processed smaller images back into a processed larger image.

It would make absolutely no sense to eliminate picture elements in Wober as defined by the present invention since the filtering in Wober would operate on an incomplete set of data and therefore yield erroneous results when the filtered data is reassembled—that is the very purpose for the overlapped data and redundant inclusion of picture elements in Wober, i.e., so that the filter can accurately operate on all of the subimages so that when they are reassembled, the system produces a

large image that is as accurate to the original as possible. The groupings created by using overlapped data in Wober would result in an *expansion* of data that would not be suitable for the compression scheme of either Pullen or the present invention. A lossy grouping of data as contemplated by Pullen and the present invention is not contemplated by Wober.

The Wober system does not serve to improve data image resolution, as indicated by the Examiner, but rather serves to reproduce an image filtering of a digital image where the filter is larger than the hardware capabilities of the imaging system (Abstract)—there is no motivation for one of ordinary skill in the art to combine such a system with a data processing system that deliberately eliminates elements from the grouping.

The problem that needs to be solved in Pullen is how to transform an inter-image-based (requiring sequential images) delineation between grouped and ungrouped picture elements (that are omitted) into an intra-image-based delineation between grouped and ungrouped picture elements (that are omitted).

In short, Wober fails to address in any way the issue of the intra-image (within image) delineation between grouped an ungrouped (omitted) image elements or how it could be combined with the Pullen reference to provide an intra-image solution for such a delineation since none of the picture elements in Wober are "ungrouped" (omitted).

35 U.S.C. §103(a), CLAIMS 30-34, 45 OBVIOUSNESS OVER PULLEN IN VIEW OF WOBER AND GIROD

2. Applicant relies on the argument presented under numbered paragraph 1 above and asserts that the combination of Pullen and Girod does not teach or

suggest the one ungrouped picture element being from at least one area of said image located between image segments and where the grouping of all except at least one picture elements is based on a mathematically defined region of the digitized image derived solely from the digitized image itself.

The Examiner includes Girod as disclosing the use of low-pass filtering. Without addressing the merits of this specific argument, Applicant asserts the Girod does not teach or suggest the missing element of the ungrouped picture element being from at least one area of the image located between image segments and the inter-image based grouping described by the independent claims from which these claims derive.

35 U.S.C. §103(a), CLAIMS 41, 51 OBVIOUSNESS OVER PULLEN IN VIEW OF WOBER AND KWAN

3. Applicant relies on the argument presented under numbered paragraph 1 above and asserts that the combination of Pullen and Kwan does not teach or suggest the one ungrouped picture element being from at least one area of said image located between image segments and where the grouping of all except at least one picture elements is based on a mathematically defined region of the digitized image derived solely from the digitized image itself.

The Examiner includes Kwan as disclosing the use of the H.245 standard along with H.263. Without addressing the merits of this specific argument, Applicant asserts the Kwan does not teach or suggest the missing element of the ungrouped picture element being from at least one area of the image located between image segments and the inter-image based grouping described by the independent claims from which these claims derive.

For these reasons, Applicants respectfully request that the §103 rejection be withdrawn from the application.

CONCLUSION

Inasmuch as each of the rejections have been overcome by the arguments presented, and all of the Examiner's suggestions and requirements have been satisfied, it is respectfully requested that the present application be reconsidered, the rejections be withdrawn and that this application be passed to issue.

Respectfully submitted,

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